

CLAIMS

1. A liquid ejection head, comprising:
 - a pressure generating portion, provided in an ink channel communicating a common ink chamber and a nozzle orifice;
 - a vibration plate, which defines a part of the pressure generating portion, so that liquid in the pressure generating portion is ejected from the nozzle orifice as a liquid droplet by deforming the vibration plate;
 - a piezoelectric vibrator, provided on a surface of the vibration plate which is opposite to a surface facing the pressure generating portion; and
 - a liquid supply port, arranged between the common ink chamber and the pressure generating portion to serve as an orifice,
- wherein the piezoelectric vibrator has a multilayer structure which comprises:
 - an upper piezoelectric layer and a lower piezoelectric layer, laminated one on another;
 - a drive electrode, formed at a boundary between the upper piezoelectric layer and the lower piezoelectric layer, and electrically connected to a supply source of a drive signal;
 - an upper common electrode, formed on a surface of the upper piezoelectric layer; and
 - a lower common electrode, formed on a surface of the lower piezoelectric layer; and
- wherein an inertance of the nozzle orifice and an inertance of the liquid supply port are greater than an inertance of the pressure generating

24 portion.

1 2. The liquid ejection head as set forth in claim 1, wherein a thickness of
2 the upper piezoelectric layer and a thickness of the lower piezoelectric layer
3 are set to 10 μm or less.

1 3. The liquid ejection head as set forth in claim 1 or 2, wherein the
2 inertance of the nozzle orifice and the inertance of the liquid supply port are
3 each set so as to be more than double the inertance of the pressure
4 generating portion.

1 4. The liquid ejection head as set forth in any one of claims 1 to 3,
2 wherein the pressure generating portion comprises:

3 a rectangular-parallelepiped pressure chamber, a volume of which is
4 varied by the deformation of the elastic plate which defines one face of the
5 pressure chamber;

6 a nozzle communication port, communicating one end of the pressure
7 chamber and the nozzle orifice; and

8 a supply-side communication port, communicating another end of the
9 pressure chamber and the liquid supply port; and

10 wherein a length of the pressure chamber is set to 1.1 mm or less.

1 5. The liquid ejection head as set forth in any one of claims 1 to 4,
2 wherein an amount of deformation of the piezoelectric vibrator is set to a value
3 of 0.16 μm or more.

1 6. The liquid ejection head as set forth in any one of claims 1 to 5,
2 wherein a compliance of the piezoelectric vibrator is set to a compliance of the
3 liquid or less.

1 7. The liquid ejection head as set forth in any one of claims 1 to 6,
2 wherein a volume of the liquid droplet ejected from the nozzle orifice is set to 6
3 pL or more, and an ejection frequency of the liquid droplet is set to 50 kHz or
4 higher.

1 8. The liquid ejection head as set forth in any one of claims 1 to 6,
2 wherein a volume of the liquid droplet ejected from the nozzle orifice is set to 3
3 pL or less, and an ejection frequency of the liquid droplet is set to 30 kHz or
4 higher.

1 9. The liquid ejection head as set forth in any one of claims 1 to 8,
2 wherein a natural period of the pressure generating portion is set to 7 μ s or
3 less.